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# ABSTRACT BOOK 2019

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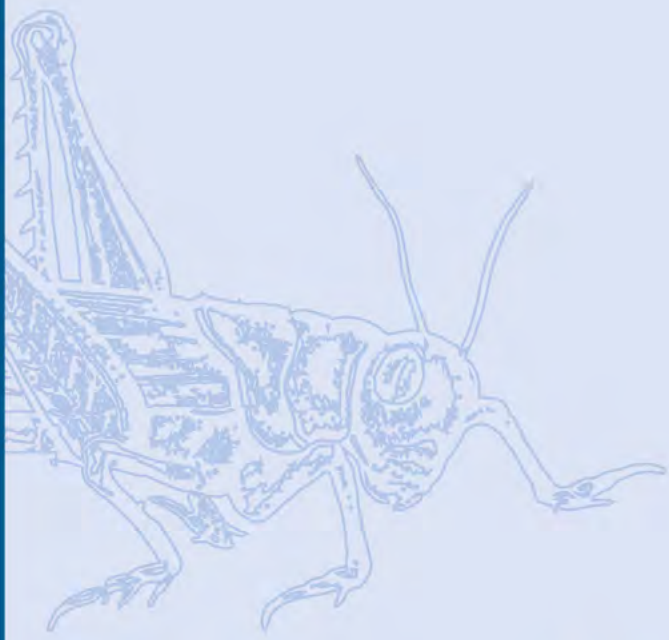


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Behaviour & Communication

# QUANTITATIVE ANALYSIS OF BEHAVIOR PHASE DIFFERENCE IN LOCUSTS WITH THE EXAMINATION OF SPATIAL DISTRIBUTION PATTERNS

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The use of cameras to analyze locust activity, attraction / repulsion is an innovation that is increasingly used in behavioral studies. It allows to simultaneously collect information without interacting with the locusts and to observe more discrete behaviors which are not visually noticeable. Although the technique is complementary to the one focused on the analysis of the individual response to a group of stimuli, it offers an improvement in the observation methods of groups of individuals through the application of spatial statistics.

In our present study, we did laboratory analysis of locust spatial distribution patterns in a circular arena for characterizing phase status. With spatial statistics, we examined the temporal variations of nearest neighbor distances as a criterion of attraction / repulsion between individuals raised either in isolation or in groups in order to induce phase behavior. Also, the successive changes of position of the individuals because of their activity in the circular arena were interpreted as criterion of differentiation between solitarious and gregarious locust phases.

Tests were carried out, first with the sequences of photographs taken at regular intervals on 3rd instar hoppers of Desert Locust, *Schistocerca gregaria*, and secondly with the help of video tracking on 3rd instar hoppers of the Migratory Locust, *Locusta migratoria*. Making inferences on the underlying process that generates the temporal variations of the positions of the hoppers in the arena, we found that there was a larger nearest neighbor distance between isolated-rearedhoppers (indicating repulsion) in contrast to crowd-rearedhoppers, which showed an attraction with their conspecifics. From the analysis of walked distances in both tests, we found a greater activity of crowd-rearedhoppers compared to isolated-rearedhoppers. This method of quantitative analysis of locust phase differences appears to be more effective in saving time and providing more insight into as yet unclear aspects of behavioral phase studies.

***Key Words:*** *Schistocerca gregaria*, *Locusta migratoria migratoria*; Phase polyphenism; attraction; repulsion; activity; Orthoptera, Acrididae.